THE OHIO STATE UNIVERSITY

Mathematics 5522H
Honors Complex Analysis
Spring
5 credits

Catalog Description:
Theoretical treatment of complex analysis.

Prerequisite:
C or better in 5520H or permission of department.

Text:
Vary, for example:

- *An Introduction to Complex Function Theory*, by B.P. Palka
- *Elementary Theory of Analytic Functions of One or Several Complex Variables*, by H. Cartan
- *Complex Analysis*, 2nd edition, by Bak-Newman
- *Complex Analysis with Applications*, by Silverman

Topics List:

1. Complex numbers, Riemann's sphere. Complex functions, elementary functions, Möbius transformations.
2. Holomorphic functions, Cauchy-Riemann equations.
3. Line integrals. Cauchy's integration theorem and its consequences.
4. Harmonic functions.
5. Sequences and series of holomorphic functions. Power series, analytic functions.
6. Isolated singularities, meromorphic functions, the calculus of residues.
7. Conformal mappings, the Riemann mapping theorem.
8. Geometric principles.
9. Mittag-Leffler's and Weierstrass's expansions of meromorphic functions.
10. Analytic continuation, Riemann surfaces.
11. Applications to number theory, geometry, physics.